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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1744	17

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Please find below and/or attached an Office communication concerning this application or proceeding.

MF-17

Office Action Summary	Application No. 09/453,518	Applicant(s) HASEDA ET AL.	
	Examiner Kaj Olsen	Art Unit 1744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 16-21 have been renumbered 15-20 respectively. In all future communications, please refer to the claims by the new claim numbers only.

On claim 18, line 3, applicant has misspelled --sensor--.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 17 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. These claims specify that the length of a conductor is selected as a function of the level of current signal outputted of the sensor. This is confusing because it would appear to the examiner that the level of current from the sensor is an unknown variable based on the level of measured signal. How can a length be selected for a quantity that hasn't been measured yet?

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 15, 17, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP ('591) in view of EP ('423), and one of Taylor (4,457,808), Bryan (4,822,456), or Kida (5,989,624).

EP ('591) discloses a gas concentration apparatus that comprising a gas concentration sensor with inherent electrical connections for output to a remote signal processor (e.g. an automotive electrical control unit (ECU)). Said sensor comprises first and second pump electrodes (22, 24) that are responsive to the application of voltage to dissociate oxygen molecules contained in the exhaust gas (col. 15, lines 16-25), and first and second sensor cell electrodes (32, 56) that are capable of dissociating NOx to produce a current signal which is a function of the NOx concentration (col. 22, lines 17-26). EP '591 also discloses an impedance measuring circuit 70, a heater control circuit 72, and a gas concentration detecting circuit (e.g. 64 of fig. 12). Although EP ('591) does not disclose the use of a signal processing circuit within a connector in order to connect the signal processing circuit to an external device, EP ('423) teaches using a signal processing unit 104 which allows a gas sensor characteristics to be compensated (i.e. calibrated) for individual sensors (see abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of EP ('423) for the sensor of EP ('591) so that the sensor of EP ('591) can be compensated for variations in sensor performance. Said sensor would ensure accurate measurement even if the

sensor was not suitably factory calibrated, or even if the sensor has degraded since original installation.

The references EP ('591) and EP ('423) do not teach the use of a microcomputer for the signal processing circuit. The reference teaches the use of analog circuitry. However, the use of microcomputers in place of conventional analog circuitry is well known in the art. In particular, Kida teaches in an alternate exhaust gas sensor that voltage supplied to the one of the pump circuits can be provided by analog circuitry or a microcomputer (col. 7, line 58 and 59). Bryan teaches that although analog circuitry is known for the controlling of electrochemical sensors, microcomputers are a preferred means because they allow for the use of algorithms (col. 3, lines 1-5). Finally, Taylor teaches that it would have been within the purview of one possessing ordinary skill in the art to substitute digital computing for analog circuitry (col. 12, lines 54-59). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize a microcomputer (as taught by Kida, Bryan, or Taylor) for the analog circuitry of EP ('423) because microcomputers provide greater control and adjustment than an analog circuit can. With respect to the length of the conductors (see 112 rejection above), although EP '423 does not explicitly set forth utilizing a length for the conductor connecting the gas sensor to the sensor circuit (a microcomputer as rendered obvious by Kida, Bryan, and Taylor), the length utilized by EP '423 would inherently be a length appropriate for a particular current level and would appear to be a function of the current level giving the claim language its broadest reasonable interpretation. Alternatively, it is well known that all conductors have characteristic line losses associated with them (typically reported in decibel (dB) per line length). If one were knowingly going to be monitoring very small signals, one possessing ordinary skill in the art

would have motivated to minimize the cable length for that small signal so as to not allow the unavoidable line losses to destroy the signal.

5. Claims 15, 17, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP ('591) in view of Amtmann et al (USP 6,347,277). Amtmann is being utilized for the first time with this office action.

6. As set forth above, EP '591 teaches all the limitations of the claim, but does not explicitly teach the use of a microcomputer controlled circuit connected to the connector of the sensor. However, Amtmann teaches such a controller for a NOx sensor (fig. 3). Said controller allows a unique calibration for each sensor to be stored with each sensor (paragraph bridging col. 1 and 2). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Amtmann for the sensor of EP '591 so that each sensor can stored with it its own unique calibration.

7. Amtmann has an effective 102 (e) date which precedes the US filing date of the instant invention, but not the foreign priority date. However, applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

8. Claims 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '591, EP '423, and any one of Kida, Bryan (or EP '591 in view of Amtmann), as applied to claims 15 and 18 above, and further in view of Takami et al (USP 6,084,418). Takami being cited for the first time with this office action.

9. The references set forth all the limitations of the claims, but did not explicitly teach the presence of a microcomputer that determines a target value to be applied to the first and second

pump cells. Takami, in an alternate gas sensor, teaches that the voltage applied across an electrochemical sensor cell should be adjusted depending on the current level being monitored by the sensor circuit (col. 7, line 66 through col. 8, line 22). The voltage chosen by the line L1 would read on the term "target voltage" giving the claim language its broadest reasonable interpretation. Adjusting the voltage ensures that the sensor is operating in the limit-current region regardless of the gas concentration, and it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Takami for the sensor set forth by the references in order to ensure the sensor is operating in the limit current region.

Response to Arguments

10. Applicant's arguments filed on 4-16-2002 have been fully considered but they are not persuasive. Applicant noticed two anomalies about the Examiner's previous Advisory Action. First, applicant pointed out that claim 1 was not mentioned as being rejected in the Examiner's comments. Second, the examiner continually referred to the rejection over EP '351 and not the previously utilized EP '591. For the record, the applicant was correct about their interpretation of both anomalies and the examiner thanks the applicant for pointing them out. It was the examiner's intention to include claim 1 in the response and it was the examiner's intention that the reference being relied on was EP '591 and not EP '351. The examiner apologizes for any inconvenience this might have caused.

11. In the arguments, it appears to the applicant that the examiner is admitting that the tertiary references (Taylor, Bryan, and Kida) are non-analogous references. Applicant has been

giving the wrong impression. First, Kida is clearly not non-analogous because it is also drawn to automotive exhaust gas sensing. Second, the examiner's position with respect to Taylor and Bryan is they are analogous for what they have been cited for. It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). Although electrochemical sensors themselves may widely vary from one sensor to another, sensors all depend on analogous electronics to perform the measurements. The basic electronics utilized for performing (as an example) amperometry will vary little from one sensor to another regardless of the details of the particular sensor. For example, commercially available potentiostats can be utilizied for a myriad of different sensors that might otherwise be construed as being non-analogous. In this particular instance, Bryan, Taylor, and Kida all teach that it was known in the art to broadly utilize microcomputer control for sensor control. This clearly indicates that one possessing ordinary skill in the art would have known to utilize microcomputers for the sensor of EP '591 and EP '423 to take advantages that microcomputer control offers.

12. Applicant also urges that none of the references teach utilizing the microcomputer to avoid noise problems. However, it has been well established that a patent cannot be granted for an applicant's discovery of a result that would flow logically from the teaching of the prior art.

13. Applicant also urges that applicant's invention is directed towards an additional digital signal processor. First, applicant does not appear to be claiming an additional signal processor. Second, both EP '591 and EP '423 were drawn to sensor circuits having a microcomputer (the

ECU) and analog circuitry. The tertiary reference suggest that it was known in the art to substitute a microcomputer controlled digital circuitry for analog components. Hence, the result of the teaching of the tertiary references would be to utilize microcomputer controlled circuitry in addition to the microcomputer already present in the automobile.

14. Applicant's other arguments concerning the absence of a teaching of a local microcomputer in Taylor and Bryan ignores that these references were utilized in conjunction with the local circuitry already taught by EP '423.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (703) 305-0506. The examiner can normally be reached on Monday through Thursday from 8:30 AM-6:00 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Robert Warden, can be reached at (703) 308-2920.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for non-after final communications is (703) 872-9310 and the fax number form after-final communications is (703) 872-9311.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.

Kaj K. Olsen, Ph.D.

Patent Examiner

AU 1744

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